

NAME _____

NUMBER OF FACTORS – I

PRINCIPLE

The number of factors variation says: x^A means “the number of counting number factors of A ,” where A is a counting number. In **Elementary** Division, A must not be bigger than **200**. In **Middle** Division, A must not be bigger than **1000**.

The “counting numbers” are 1, 2, 3, 4, 5, ... (*not* 0).

EXAMPLES

- $x(6 \times 2) = x12 = 6$ since the factors of 12 are 1, 2, 3, 4, 6, and 12.
 ↗ because of its placement, this x means multiplication.
- $x(4 \times 4) = x16 = 5$ because the factors of 16 are 1, 2, 4, 8, and 16.
- These expressions are undefined: $x0$, $x(1 \div 2)$, and $x(1 - 4)$.
 In **Elementary** Division, $x(5 * 4)$ is undefined since $5 * 4$ is bigger than 200.
 In **Middle** Division, $x(5 * 5)$ is undefined since $5 * 5$ is bigger than 1000.
- $xx9 = x(x9) = x3$ (since 9 has 3 factors) = 2 (since 3 has 2 factors).
- A Goal of $x \ 4 \ x \ 8$ has two interpretations. In both interpretations, the first x means number of factors and the second means multiplication.
 - $(x4) \times 8 = 3 \times 8 = 24$ [since 4 has 3 factors].
 - $x(4 \times 8) = x32 = 6$ [1, 2, 4, 8, 16, and 32 are the factors of 32.]

EXERCISES

Assume number of factors has been chosen. Write all possible values of each expression
 If an expression is undefined in your division, write **undefined**.

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|--------------------------|--------------------------|----------------|----------------|
| 1. x^1 _____ | 2. x^2 _____ | 3. x^3 _____ | 4. x^4 _____ |
| 5. x^6 _____ | 6. x^7 _____ | 7. x^8 _____ | 8. x^9 _____ |
| 9. $x^5 \times 2$ _____ | 10. $x^6 \times 2$ _____ | | |
| 11. $x^8 + 7$ _____ | 12. $x^5 - 7$ _____ | | |
| 13. $x^4 \div 8$ _____ | 14. $x^2 * 4$ _____ | | |
| 15. $4 * x^5$ _____ | 16. $x^4 \sqrt{8}$ _____ | | |
| 17. $\sqrt{x} \ 8$ _____ | 18. $x^7 + x^9$ _____ | | |
| 19. $xx9 + x8$ _____ | 20. $x^5 - xx6$ _____ | | |

MORE CHALLENGING EXERCISES

Write all possible values of each Goal in your division.

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|----------------------|-----------------------------------|
| 21. $x^2 * 7$ _____ | 22. $x^9 \times 11$ _____ |
| 23. $x^8 * 25$ _____ | 24. $x^4 \times 2 \times 8$ _____ |